INDUSTRIALISED BUILDING SYSTEMS (IBS)

ROADMAP 2003-2010
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Malaysia is well known for its forward looking policies and strategies in the quest for global participation in all facets of industry. Being a global player in construction requires serious efforts towards adopting new systems and technologies par excellence with other developed and developing nations. The success of these efforts will enable us to penetrate the global market and export our professional and construction expertise while improving our own local development and management.

The Industrialised Building Systems (IBS) promises elevated levels of expertise throughout the industry, from manufacturers, installers, engineers, planners, designers, and developers. The benefits of IBS are numerous and far reaching. Reduced construction time, better site management, reduced wastage are but a few of these benefits, that will ultimately produce better products for the population.

The Malaysian government has spared no effort to bring IBS to the drawing tables of all professionals involved in the built environment. The IBS Roadmap 2003-2010 has been endorsed by the Cabinet of Ministers to be the blueprint document for the industrialisation of the Malaysian construction sector. In ensuring its success, I urge the members of the construction industry to act upon our Government’s call for the adoption of IBS.

In my final note, I would like to thank CIDB and the IBS Steering Committee and Working Group members for their efforts in formulating this document.

DATO’ SERI S. SAMY VELLU
MINISTER OF WORKS, MALAYSIA
FOREWORD BY SECRETARY GENERAL, MINISTRY OF WORKS

The construction industry plays a crucial role in the Government’s efforts to stimulate domestic economic activities and enhance growth. It is therefore important for the sector to continuously undertake measures to increase efficiency, quality and productivity. Towards this end, the use of the Industrialised Building Systems (IBS) is the right step in realising this objective.

The IBS, which enables on-site prefabricated or pre-cast building components manufactured at factories, will enable cost saving and quality improvement through the reduction of labour intensity and construction standardisation. Apart from this, it offers minimal wastage, less site materials, cleaner and neater environment, controlled quality, and lower total construction costs. Recognising the vast benefits and potential of the IBS, the Ministry of Works through its agencies such as the CIDB and the Public Works Department will continue to promote the use of IBS throughout the construction industry based on the IBS Roadmap 2003 - 2010.

The Ministry hopes that more private developers would support the Government’s call by using higher percentage of IBS in the construction of housing and other building projects. Undoubtedly, with better productivity, quality and safety, IBS will contribute towards a better construction industry, as well as enhance the global competitiveness of Malaysian builders.

DATO’ IZZUDDIN DALI
SECRETARY GENERAL, MINISTRY OF WORKS
FOREWORD BY
CHIEF EXECUTIVE, CIDB

CIDB Malaysia formed the IBS Steering Committee in the effort to bring to the fore all the IBS-related issues in a framework that could dovetail into a feasible direction. The IBS Strategic Plan 1999 was the result of this effort and proved to be a good framework that set wheels in motion towards full adoption of IBS industry wide.

While many members of the industry are open to the idea, a major portion of the industry stakeholders are indifferent, perhaps due to resistance towards change, or insufficient information on the feasibility of change to IBS.

To address the many issues facing full adoption of IBS, CIDB has redesigned its strategies and formulated the IBS Roadmap 2003 -2010. The document has been fine-tuned by the IBS Steering Committee and the 5-M Working Groups.

Based on the 5-M strategy (Manpower, Materials-Components-Machines, Management-Processes-Methods, Monetary and Marketing) it has the aim of having an industrialised construction sector by the year 2010.

The committee members have put in invaluable time and thoughts to the detailing of IBS Roadmap 2003 - 2010 and it has since been approved by the Cabinet as the blueprint document for the industrialisation of the Malaysian construction sector. It is time that the industry reciprocates by adopting IBS in all ways possible to create a better future for generations to come and at the same time, raising the quality standard of the built environment and become a technologically advanced population.

DATO’ Ir. HAMZAH HASSAN
CHIEF EXECUTIVE, CIDB
With its current levels of quality, productivity, safety and excessive reliance on unskilled foreign workers, the state of the local construction industry is not in line with the future development of Malaysia.

Early efforts by the government to promote usage of Industrialised Building Systems (IBS) as an alternative to the conventional and labour intensive construction method has not made a headway. Therefore CIDB has redesigned its strategies and, with the guidance from the IBS Steering Committee, has formulated a roadmap based on the 5-M strategy (Manpower, Materials-Components-Machines, Management-Processes-Methods, Monetary and Marketing) with the target of having an industrialised construction industry and achieving Open Building by the year 2010.

In integrating its efforts from various organisations, targets have been set based on the five Ms in order to ensure the global competitiveness of Malaysian construction players through the usage of IBS.
The Industrialised Building Systems (IBS) is a construction process that utilises techniques, products, components, or building systems which involve prefabricated components and on-site installation. From the structural classification, there are five IBS main groups identified as being used in this country, and these are:

1. **Pre-cast Concrete Framing, Panel and Box Systems**
   - Pre-cast columns, beams, slabs, 3-D components (balconies, staircases, toilets, lift chambers), permanent concrete formwork, etc;

2. **Steel Formwork Systems**
   - Tunnel forms, beams and columns moulding forms, permanent steel formworks (metal decks, etc);

3. **Steel Framing Systems**
   - Steel beams and columns, portal frames, roof trusses, etc;

4. **Prefabricated Timber Framing Systems**
   - Timber frames, roof trusses, etc;

5. **Block Work Systems**
   - Interlocking concrete masonry units (CMU), lightweight concrete blocks, etc.
The use of IBS assures valuable advantages such as the reduction of unskilled workers, less wastage, less volume of building materials, increased environmental and construction site cleanliness and better quality control, among others.

These advantages also promote a safer and more organised construction site, and reduces the completion time of construction. Many world-class Malaysian developers have chosen IBS over the conventional methods for important projects such as the Petronas Twin Towers, Putrajaya, KL Sentral, and KLIA.

Even so, the usage of IBS in building is still low. From a survey conducted by CIDB Malaysia, the usage level of IBS in the local construction industry stands at only 15% (IBS Survey 2003). The early efforts of the Government to encourage the use of IBS in the construction sector has yet to garner a good response, and this sector is still practising conventional construction methods that have proven time and again to be wasteful, dangerous and messy. Relatively, the low labour cost in this country is the root cause of the industry failing to reform and being complacent with the current level of productivity, quality and safety. However, it cannot be disputed that to be competitive at the international level, it is important for the Malaysia construction industry to evolve and be ready for the globalisation era where an increase in productivity, quality and safety is a must.

The industry needs one fundamental plan that involves all the important aspects in this evolution process. In this respect, the IBS Roadmap 2003-2010 is formulated as a reference for all parties in implementing all programmes towards the modernisation of the Malaysian construction sector.

The IBS Roadmap 2003-2010 has been discussed and agreed upon at the national level through the IBS Steering Committee and Working Groups organised by CIDB Malaysia where the members are represented by the government sector, developers, manufacturers, contractors, professional bodies, higher learning institutions, associations, and other interested parties in the construction industry. The IBS Steering Committee and Working Groups have produced the IBS Roadmap 2003 - 2010 and will also ensure that its programs are implemented to meet the total industrialisation of Malaysia's construction industry by the year 2010.
Fine-tuning the IBS Strategic Plan 1999, the outlined strategies encompass manpower, material/ component/ machine, management/ process/ method, monetary (economy/financial) and marketing/ promotion. This roadmap has been endorsed by the Cabinet of Ministers as the blueprint for the total industrialisation of the construction sector and achieving Open Building by 2010.

Based on the IBS Roadmap 2003 - 2010, positive impacts from the fundamental proposal and new Government incentives are:

1. The industry will choose IBS which guarantees better quality, productivity and safety;

2. The enforcement of using Modular Coordination (MC) through Uniform Building By Laws (UBBL) will encourage standardisation and subsequently increase the usage of IBS components. It also encourages participation from manufacturers and assemblers, especially Bumiputera, to enter the market, thus reducing the price of IBS components. In essence, MC will facilitate open industrialisation.

3. A screening and selection programme based on IBS standard components will ensure that low quality products are not marketed in the country and this prevents the dumping of foreign IBS products in Malaysia. This aspect is important to avoid failures in IBS projects; and

4. By reducing wet-trades through IBS, the dependency on foreign workers will also diminish, thus gaining the billions of Ringgit currently being transferred out by the foreign workers to their home countries, and reducing inherent social problems involving these foreign workers.
Continue efforts to develop NOSS (National Occupational Skill Standards).

Continue workers’ training and certification programme to include all types of IBS.

Commence the training programme on mould making for IBS components.

Commence the industrial expertise awareness programme together with IBS manufacturers through on-job training for trainees.

Commence the site supervisory training and certification programme which includes knowledge on IBS.

Introduce Continual Professional Development (CPD) courses regarding IBS / Modular Coordination (MC) for members of Board of Engineers Malaysia and Board of Architects Malaysia.

Introduce IBS / MC syllabus to diploma and degree level students in private and public higher learning institutions.

Continue IBS / MC technical training courses.

Generate a Labour Policy so that the number of foreign workers in the construction industry can be reduced in stages (reducing the foreign labour work force percentage of the total construction workers - from 75%\(^1\) in 2003 to 55% in 2005 and 15% in 2009); especially those involved in wet-trades such as carpenters, plasterers, and barbenders.

\(^1\) 75 foreign workers out of 100 construction workers
Enforce the use of Modular Coordination based on MS1064 through Uniformed Building By Laws (UBBL) in 2004 by the local authorities.

Continue publishing reference books and case study reports regarding IBS.

Continue writing new Malaysian Standards (MS) covering all types of IBS.

Continue writing new Construction Industry Standards (CIS).

Develop a series of standard construction components and pre-approved building plans for the green lane approval programme by the local authorities.

Develop the Buildability Design Code to encourage the use of standardised IBS components and also help the IBS manufacturers obtain continuous orders.

Continue Research and Development (R&D) efforts to produce local IBS innovations.

Generate the IBS Verification Programme and Resource Centre for selection process and certification, to supervise all IBS technologies offered for use by the Malaysian construction industry.
Include the IBS / MC knowledge into the Standards of Practice and training modules for the training and certification of Project Managers.

Offer specialised contractors training and certification programmes to cater for IBS related registration codes.

Develop and run the Quality Assurance programme for each type of IBS.

Develop Quality Management System (QMS) templates for design, production, and installation.

Enforce Regulatory Compliance based on the standards for IBS components as the selection tool for IBS products starting from 2005.

Develop software for MC components and dimensioning.

Develop database for pre-approved building plans.

Develop interactive database for components and costs for manufacturer-installers.

Develop virtual reality software for architectural and structural components.

Continually update the website to disseminate information on IBS, MC and OBS.
Use IBS to construct 30% of the 150,000 units of houses proposed to be built by Syarikat Perumahan Negara Berhad (SPNB) under the 2003 Economy Stimulus Package (New Strategies Towards Enhancing the Country’s Economic Growth).

Continuously collect data for completed and on-going projects including IBS/MC pilot projects programmes.

Conduct studies every 5 years to forecast the IBS components’ needs for the Malaysian construction industry.

Enforce IBS usage in government (building) projects in phases (from 30%\(^2\) in 2004 to 70% in 2008).

Introduce Buildability\(^3\) Programme beginning 2006 for private (building) projects and enforcing it through the Local Authorities in 2008.

Offer tax reduction incentives for the Bumiputera component manufacturers starting in 2005.

Offer green lane approval programme for users of the standard building plans designed in compliance to MC and standard building components beginning 2004.

Offer levy exemptions from 2004 for low cost, low medium cost and medium cost housing projects and reduce 50% levy for other types of houses for the developers using modular dimension in their designs - after end of the enforcement period of the 2003 Economy Stimulus Package.

Offer training schemes and financial loans for Bumiputera manufacturers and contractors (installers) beginning 2004.

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\(^2\) 30 government projects using IBS out of every 100 government projects.

\(^3\) Under this score system, the proposed building projects must achieve the minimum buildability score. High percentage of MC and IBS usage will generate high score.
Conduct IBS Lobby Group programmes.
Demonstrate IBS through IBS Village Showcase.
Publish IBS product catalogues.
Promote IBS more aggressively in the mass media.
Continue IBS / MC road show programmes at the national and international levels.
Continue seminar programmes at the national and international levels.
Establish IBS as the main criteria for Malaysian Construction Industry Excellence Awards.
Publish more IBS related books and journals.
Produce more studies on IBS usage in the industry.
Continuously conduct industry round table discussions on IBS to address the effectiveness of the programmes.
Continue industry coordination programs through IBS Steering Committee and working groups.
Introduce concept of Open Building Systems to the industry.
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National Productivity Centre

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Encik Lai Voon Hon
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Ministry of Human Resources

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Y.Bhg. Dato' Wan Zakariah Wan Muda
Ahmad Zaki Resources Bhd.

Encik Shahrul Nizar Shaari
Construction Industry Development Board Malaysia

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Dr. Mohd Jamil Sulaiman
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Puan Noridah Shaffii
Construction Industry Development Board Malaysia

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Real Estate and Housing Developers Association

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Master Builders Association Malaysia

Ar. Lim Peng Keang
Malaysian Institute of Architects

Prof. Madya Ir. Dr Mohd Salleh Jaafar
University Putra Malaysia

Encik Ong Sin Oong
Federation Manufacturers of Malaysia

Encik Sazali Che Amat
Construction Industry Development Board Malaysia
IBS PROJECTS IN MALAYSIA

Petronas Twin Tower
Monorail
Vista Komenwel
Aquatic Stadium, Bukit Jalil

KL Tower
Putrajaya Bridge
Shopping Centre, Mutiara Damansara
Putra Jaya Housing

Light Rail Transit
Teachers Quarters
KL Central
National Stadium Bukit Jalil

Kuala Lumpur International Airport (KLIA)
# IBS Roadmaps 2003 - 2010

## Training and Certification for Workforce

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<td>To Start Program for Light Weight Steel, Roof Trusses &amp; Frames Installation</td>
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<td>To Start Program for Site, Frames, Trusses &amp; Panels Installation</td>
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## New National Occupational Skill Standards (NOSs)

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## Training and Certification for Site Supervisors

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<td>Courses for Site Supervisors, Civil &amp; Structural, Building &amp; Construction, Mechanics &amp; Electrical, &amp; Other</td>
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<td>To Reduce blush of site supervisors</td>
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<td>To Develop New Programmes for Site Supervisors and Certification Programmes</td>
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<td>To Train and Certify Site Supervisors (New Syllabus)</td>
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## New Professionals

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<td>NC Training Modules Produced in 2003</td>
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<td>To conduct several research projects (jointly)</td>
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<td>To embark on certification of structural and architectural products from 350 MCY of manufacturers</td>
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<td>To embark on certification of structural and architectural products from 350 MCY of manufacturers</td>
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**Materials / Components / Machines**
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<tr>
<td><strong>Project Management</strong></td>
<td>General Project Management Courses</td>
<td>To test on foundation for project management</td>
<td>To produce training modules, training programmes and train the training programmes</td>
<td>To train and certify project managers</td>
<td>To produce training modules, training programmes and train the training programmes</td>
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<td><strong>Contractions (Assembly) Training Programmes</strong></td>
<td>General courses for contractors</td>
<td>Specialized training programme for BS 5834 related regulations codes</td>
<td>To train and certify contractors for BS 5834 related regulations codes</td>
<td>To revise training programme for contractors for BS 5834 related regulations codes</td>
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<td><strong>Quality Programmes</strong></td>
<td>Quality Management (BS 5834 activities)</td>
<td>To produce Quality Assurance Programme on powder coat (plates, doors, etc.) to the BS 5834 standards</td>
<td>To produce Quality Assurance Programme on Powder Coating &amp; Steel Roof Trusses</td>
<td>To produce Quality Assurance Programme on Steel Frames &amp; System Formwork</td>
<td>To produce Quality Assurance Programme on Timber Frames</td>
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<td><strong>IT in Construction Programmes</strong></td>
<td>Send on demand promoted to CIO websites</td>
<td>To update info for new CIO website</td>
<td>To release PC computer software for designers</td>
<td>To release pre-approved plans in libraries</td>
<td>To release information on manufacturer's components and cost database</td>
<td>To release information on visual reality</td>
<td>To launch new website</td>
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<tr>
<td>STUDIES</td>
<td>TO BEGIN DATA COLLECTION CONTINUOUSLY ON ALL 38I PROJECTS</td>
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<td>TO COMPLETE 5-YEAR DEMAND STUDY</td>
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<td>TO COMPLETE 5-YEAR DEMAND STUDY</td>
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<td>INCENTIVES</td>
<td>TO BEGIN SEED FUND PROGRAMS (10% OF R &amp; D SPENDED)</td>
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<td>TO BEGIN TAX INCENTIVE PROGRAMS FOR 38I COMPONENT MANUFACTURERS</td>
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<td>TO END LEVY FOR LOW, MIDDLE INCOME &amp; MIDDLE MIDDLE HOUSES, AND TO ADD 50% SUBSIDY FOR OTHER TYPES OF RESIDENCES</td>
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<td>(AN END OF 2003 STIMULUS PROGRAM)</td>
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<td>PROCUREMENT POLICY 5% OF GoVEMMENT PROJECTS TO USE 38I MANUFACTURES</td>
<td>TO HAVE 38I OF TOTAL GOVERNMENT (BUILDING) PROJECTS TO USE 38I</td>
<td>TO HAVE 38I OF TOTAL GOVERNMENT (BUILDING) PROJECTS TO USE 38I</td>
<td>TO HAVE 38I OF TOTAL GOVERNMENT (BUILDING) PROJECTS TO USE 38I</td>
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<td>TO INTRODUCE VENDOR BUILDABILITY SCORE FOR ALL PRIVATE DEVELOPERS</td>
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<td>TO IMPROVE VENDOR BUILDABILITY SCORE FOR ALL PRIVATE DEVELOPERS</td>
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<td>B 38I</td>
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<td>Awareness &amp; Promotion</td>
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<td>Product Exhibitions &amp; Seminars</td>
<td>To have national SS seminars</td>
<td>To have international, regional, &amp; trade seminars</td>
<td>To have international, regional, &amp; trade seminars</td>
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<td>To have national SS roadshows</td>
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<td>Ongoing SS Course from 2003</td>
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<td>To have national SS roadshows</td>
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<td>To have media exposure in trade magazines &amp; national supplements</td>
<td>To have media exposure in trade magazines &amp; national supplements</td>
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<td>To publish product catalogue</td>
<td>To publish annual SS product catalogue</td>
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<td>LC logo launching in 2010</td>
<td>To turn SS lobby group</td>
<td>To launch public awareness programme</td>
<td>To complete SS village (Istana)</td>
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<td>Seminars &amp; Workshops</td>
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<td>RC effect programme launching &amp; roadshows</td>
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<td>Seminars colloquiums in 1999</td>
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<td>SS strategy for 2010 workshop in 2005</td>
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<td>SS national seminar in 2003</td>
<td>To organize SS international seminar 2003</td>
<td>To organize SS international seminar 2004</td>
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<td>RC Re-tracking Workshop in 2002</td>
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<td>Annual EBS Award</td>
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<td>EBS project award in 2003</td>
<td>To get SS usage as main criteria for Malaysian construction industry excellence award 2003</td>
<td>To get SS usage as main criteria for Malaysian construction industry excellence award 2005</td>
<td>To get SS usage as main criteria for Malaysian construction industry excellence award 2007</td>
<td>To get SS usage as main criteria for Malaysian construction industry excellence award 2009</td>
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<td>Expert Input/Technology Transfer</td>
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<td>BIM publications in magazines</td>
<td>To publish BIM survey report 2003</td>
<td>To begin BIM study report</td>
<td>To publish BIM survey report 2005</td>
<td>To publish BIM survey report 2007</td>
<td>To begin publishing quarterly OBS magazine</td>
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<td>SS seminars</td>
<td>To publish SS book</td>
<td>To publish revised SS book</td>
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<td>Ongoing building technical conference in 2003</td>
<td>To organize round table dialogue on BIM</td>
<td>To organize round table dialogue on BIM</td>
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<td>Technical visits to MC practices countries in 2010</td>
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<td>Industry Coordination</td>
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<td>SS Tendering Committee launched</td>
<td>To produce SS roadmap (2003-2010)</td>
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